

**CATALOG DOCUMENTATION  
REGIONAL ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM - REGION 6  
1993-1994 TEXAS COAST RIVERS AND ESTUARIES STUDY  
FISH/INVERTEBRATE SUMMARY DATA**

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**1. DATA SET IDENTIFICATION**

**1.1 Title of Catalog Document**

**Regional Environmental Monitoring And Assessment Program - Region 6  
1993-1994 Texas Coast Rivers And Estuaries Study  
Fish/Invertebrate Abundance and Diversity Data Summarized for a  
Station**

**1.2 Authors of the Catalog entry**

**Melissa M Hughes, OA0 Corp.**

**1.3 Catalog Revision Date**

**April 2, 1998**

**1.4 Data File Name**

FISH\_SUM

**1.5 Task Group**

Region 6

**1.6 Data set identification code**

00006

**1.7 Version**

001

**1.8 Requested Acknowledgment**

If you plan to publish these data in any way, EPA requires a standard statement for work it has supported:

"Although the data described in this article have been funded wholly or in part by the U. S. Environmental Protection Agency through its R-EMAP Program, it has not been subjected to Agency review, and therefore does not necessarily reflect the views of the Agency and no official endorsement should be inferred."

**2. INVESTIGATOR INFORMATION**

**2.1 Principal Investigator**

Charlie Howell  
U. S. Environmental Protection Agency - Region 6  
Environmental Services Division

**2.2 Investigation Participant-Sample Collection**

Not applicable

**3. DATA FILE ABSTRACT**

**3.1 Abstract of the Data File**

The Fish Summary data file is a synopsis of various averages of successful standard trawl(s) conducted at a station. The total number of nektonic species and individuals of all species caught in the standard trawl(s) is reported.

**3.2 Keywords for the Data file**

Species, species abundance, species diversity

#### 4. OBJECTIVES AND INTRODUCTION

##### 4.1 Program Objective

The R-EMAP Texas Coast project will:

1. Determine the extent and magnitude of tri-butyltin (TBT) contamination in Galveston Bay sediment and water column.
2. Determine the extent and magnitude of contaminant levels in the fish and sediment of the East Bay Bayou of Galveston Bay and whether the incidence of fish pathologies is correlated with sediment contamination.
3. Determine the levels of chlorinated hydrocarbons in fish tissue, conduct chemical and toxicity tests of sediments and determine benthic community structure in the tidal reaches of the Arroyo Colorado and the Rio Grande Rivers.
4. Determine the extent and magnitude of anoxia and concentrations of agriculture-related contaminants found in the tidal reaches of the Arroyo Colorado and Rio Grande Rivers.

##### 4.2 Data Set Objective

The objective of the Fish/Invertebrate Summary data file was to collect information to characterize nektonic assemblages in the estuaries of the south Texas coast.

##### 4.3 Data Set Background Discussion

Estuarine nekton have economic, recreational, and ecological value. Abundant nektonic organisms, particularly in communities characterized by multiple species and feeding type, suggest a productive estuarine food web. Several subsets of nekton were selected for the EMAP-Estuaries fish community profile: finfish; blue crab; and brown, white and pink shrimp.

Finfish are particularly good candidates for use as potential indicators of estuarine condition. Most fish ecologists agree that the assemblage of fish that occurs at a sampling site is affected by water and sediment quality parameters and habitat conditions. Because of their longevity and dominant position at the upper end of the food web, fish responses integrate many short-term and small-scale environmental perturbations. Fish are known to respond to most of the major environmental stressors of concern in estuaries, including eutrophication, habitat modification and pathogenic or toxic contamination. Since the blue crab and shrimp are significant to the Gulf Coast economy, these shellfish species were selected to determine if environmental stressors that may or may not affect the finfish community would have the same affect on these valuable fisheries.

A major purpose of evaluating fish/invertebrate community composition was to determine whether regional information on fish and invertebrate community characteristics could be used as an indicator of environmental quality.

#### 4.4 Summary of Data Set Parameters

The raw data for species composition and abundance were recorded in the field after the completion of each successful standard trawl. Fish or invertebrate target species were preserved for tissue chemistry or reference pathology analysis. All fish observed to have pathological defects were preserved for detailed histopathological examination.

#### 4.5 Year-Specific Information about Data

Up to three fish trawls were conducted per station. This increased the chances that nekton specific data would be more accurately represented and tissue chemistry samples would be available for each site. Occasionally, however, a field crew would conduct more than three (3) trawls in order to obtain enough tissue samples for chemistry analysis. Any trawl conducted after the first three (3) attempts was not used for any of the summary calculations. The actual number of trawls taken for each stations is reflected in the Fish Abundance data file.

For sampling year 1993, the finfish, spot, (*Leiostomus xanthurus*) were collected and preserved to be used specifically as reference histopathology samples.

### 5. DATA ACQUISITION AND PROCESSING METHODS

#### 5.1 Data Acquisition

##### 5.1.1 Sampling Objective

Conduct two (2) successful standard fish trawls at a Sampling Site suitable for the characterization of fish species composition, abundance and length.

##### 5.1.2 Sample Collection Method Summary

A balloon trawl (funnel-shaped net) was deployed from the sampling vessel using a hydraulic powered boom and winch system and dragged over the bottom in the general vicinity of the sampling station to capture bottom and near-bottom fishes and crustaceans. The duration of a trawl was 10 +/- 2 minutes and the rate of speed over bottom was 2-3 knots. Following a successful trawl, the net was hauled aboard and the catch was released into a plastic trough or fish sorting table.

All fish and invertebrates of interest were sorted and identified to species and a total count taken for each species.

Up to 30 individuals of a given species were measured to the nearest 0.1 cm - fork length (when applicable or overall length for fishes; tip of rostrum to tip of telson for shrimp; and carapace width (spine to spine) for crabs. The pertinent fish data were recorded on preprinted, standardized field sheets (Fish Data Sheets) for later transcription into the field computer system.

### 5. 1. 3 Beginning Sampling Dates

24 September 1993  
10 August 1994

### 5. 1. 4 Ending Sampling Date

10 October 1993  
16 August 1994

### 5. 1. 5 Platform

Each team was supplied with a 25-foot SeaArk work boat equipped with a 7.5 L gas engine fitted with a Bravo outdrive, an "A" frame boom assembly and hydraulic winch. On-board electronics consist of: a Loran C unit, GPS, radar unit, 2 VHF radios, cellular phone, compass, a depth finder, a tool kit, and all required and suggested safety equipment.

### 5. 1. 6 Sampling Equipment

The net used was a 4.9 m (16 ft) -wide, balloon (high profile) trawl with 2.5 cm (1 in) stretched mesh in the bosom, wings, and cod end; no liner was used. The trawl was equipped with 41 X 76 cm ( 16 X 30 in ) wooded doors.

### 5. 1. 7 Manufacturer of Equipment

NA

### 5. 1. 8 Key Variables

The total count of individuals of a taxon collected at a station, species identification information and individual length were recorded after sample collection.

### 5. 1. 9 Sampling Method Calibration

The sampling gear did not require calibration. It required inspection for tears and proper assemblage.

### 5. 1. 10 Collection Quality Control

A trawl was considered void if one or more of the following conditions occurred:

5. 1. 10. 1 A ten (10) minute tow could not be completed because of hangdown, boat malfunction, vessel traffic, or major disruption of gear. However, a tow was considered acceptable if it was necessary to retrieve the net after at least eight minutes due to impending hazards, as long as the net was retrieved in the standard manner.

5. 1. 10. 2 Boat speed or speed over the bottom was beyond the prescribed, acceptable range.

- 5. 1. 10. 3 The cod-end of the net was not tied shut.
- 5. 1. 10. 4 The trawl continued for more than twelve minutes or less than eight minutes.
- 5. 1. 10. 5 The net was filled with mud or debris.
- 5. 1. 10. 6 A portion of the catch was lost prior to processing.
- 5. 1. 10. 7 The tow wire, bridle, headrope, footrope, or up and down lines parted.
- 5. 1. 10. 8 The net was torn in a way that may have significantly altered the efficiency of the net.

If, due to repeated snags, a successful trawl could not be performed within 1 1/2 hours of starting, no further attempts were made and the Field Operations Center was notified.

If the trawl was successful and fish were caught, the specimens designated for chemistry or pathology analysis were contained appropriately for shipping to various labs. Each species of fish for a particular station were tracked using a barcode system. As the field crew prepared the specimens for shipping, the fish would be grouped by species and type of lab analyses needed then tagged with a waterproof barcode label bearing a unique identification number. A duplicate barcode was placed on the appropriate data sheet. Each barcode label was scanned into a datafile using laser barcode readers. This method of tagging provided the EMAP-E team an efficient, accurate and viable accounting of fish shipped to laboratories for further analysis. The laboratories were also supplied with barcode readers so fish received by lab personnel could be documented. The lab receiving files were electronically forwarded to EMAP-E for shipping and receiving reconciliation.

#### 5. 1. 11 Sample Collection Method References

Macauley, J. M. 1991. Environmental Monitoring and Assessment Program-Near Coastal Louisiana Province: 1991 Monitoring Demonstration. Field Operations Manual. EPA/600/X-91/XXX. U. S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

#### 5. 1. 12 Sample Collection Method Deviations

None

### 5. 2 Data Preparation and Sample Processing

#### 5. 2. 1 Sample Processing Objective

Sample processing methods not applicable for estimates of fish/invertebrate species composition and abundance.

### 5. 2. 1 Sample Processing Objective

NA

### 5. 2. 2 Sample Processing Methods Summary

NA

### 5. 2. 3 Sample Processing Method Calibration

NA

### 5. 2. 4 Sample Processing Quality Control

NA

### 5. 2. 5 Sample Processing Method Reference

NA

## 6. DATA ANALYSIS AND MANIPULATIONS

### 6. 1 Name of New or Modified Value

FSP\_TOT Total Fish Taxa (#) in 'n' Trawls

FSP\_ABN Total Individual Fish (#) in 'n' Trawls

### 6. 2 Data Manipulation Description

FSP\_TOT Total number of taxon collected at a station

FSP\_ABN Total number of individuals collected at a station

### 6. 3 Data Manipulation Examples

#### 6. 3. 1 Total abundance

FSP\_ABN represents the sum of the abundances of all taxa collected from successful trawl(s) at a station. The abundance indicated here is an aggregate of all fish and targeted non-fish (e.g. Blue crab, Shrimp) individuals that are caught in the trawl(s) at a particular sampling site.

Total Individuals/Trawl) = FSP\_ABN.

#### 6. 3. 2 Total Taxa

FSP\_TOT represents the total of number each fish/invertebrate taxa collected from each successful trawl at a station.

#### 6. 3. 3 Mean Number of Individuals

FSP\_MABN represents the arithmetic mean of the number of individuals in each unique taxa collected from each successful trawl at a station.

FSP\_MABN is calculated as TOTAL # Ind. / # TRAWL.

#### 6.3.4 Mean Number of Taxa

FSP\_MEAN represents the arithmetic mean of the number of unique fish/invertebrate taxa collected from each successful trawl at a station.

FSP\_MEAN is calculated as  $TOTAL \# \text{ TAXA} / \# \text{ TRAWL}$ .

#### 6.3.5 Mean Number of Trawls

FSP\_TRWL represents the total Number of successful trawls used for summary data. The target number of trawls used in this summary is two successful trawls.

### 7. DATA DESCRIPTION

#### 7.1 Description of Parameters

| Field Name | Data Type | Field Len | Format   | Variable Field Label                    |
|------------|-----------|-----------|----------|---|
| STA_NAME   | Char      | 46        | \$8.     | The STA_NAME Identifier                 |
| FSP_ABN    | Num       | 8         | 5.       | Total Individual Fish (#) in 'n' Trawls |
| FSP_TOT    | Num       | 8         | 5.       | Total Fish Taxa (#) in 'n' Trawls       |
| FSP_MABN   | Num       | 8         | 7.2      | Mean # Organisms in 'n' Trawls          |
| FSP_MEAN   | Num       | 8         | 7.2      | Mean # Fish Taxa in 'n' Trawls          |
| FSP_TRWL   | Num       | 8         | 2.       | Trawls (#) included in Summary Data     |
| VST_DATE   | Num       | 8         | YYMMDD6. | The Date the Sample was Collected       |
| QA_CODE    | Char      | 7         | \$8.     | QA Code for Fish Trawl                  |

#### 7.1.6 Precision to which values are reported

Total abundance and taxa and pathology results for a station are reported as whole numbers. Mean abundance and taxa are reported to two decimals.

#### 7.1.7 Minimum Values in Data Set

| Variable | Minimum |
|----------|---------|
| FSP_ABN  | 0       |
| FSP_TOT  | 0       |
| FSP_MABN | 0.00    |
| FSP_MEAN | 0.00    |
| FSP_TRWL | 1       |

#### 7.1.8 Maximum Values in Data Set

| Variable | Maximum |
|----------|---------|
| FSP_ABN  | 684     |
| FSP_TOT  | 18      |
| FSP_MABN | 342.00  |
| FSP_MEAN | 9.00    |
| FSP_TRWL | 2       |

## 7.2 Data Record Example

### 7.2.1 Column Names for Example Records

| STA_NAME | VST_DATE | FSP_TOT | FSP_ABN | FSP_MEAN | FSP_MABN | FSP_TRWL | QA_CODE |
|----------|----------|---------|---------|----------|----------|----------|---------|
|----------|----------|---------|---------|----------|----------|----------|---------|

### 7.2.2 Example Data Records

| STA_NAME | VST_DATE | FSP_TOT | FSP_ABN | FSP_MEAN | FSP_MABN | FSP_TRWL | QA_CODE |
|----------|----------|---------|---------|----------|----------|----------|---------|
| LA93AC1  | 931007   | 8       | 47      | 4.00     | 23.50    | 2        |         |
| LA93AC10 | 931008   | 1       | 5       | 0.50     | 2.50     | 2        |         |
| LA93AC2  | 931007   | 11      | 132     | 5.50     | 66.00    | 2        |         |
| LA93AC3  | 931007   | 1       | 2       | 0.50     | 1.00     | 2        |         |
| LA93AC4  | 931008   | 1       | 8       | 0.50     | 4.00     | 2        |         |

## 8. GEOGRAPHIC AND SPATIAL INFORMATION

### 8.1 Minimum Longitude

-97 Degrees 36 Minutes 16.20 Decimal Seconds

### 8.2 Maximum Longitude

-94 Degrees 24 Minutes 33.00 Decimal Seconds

### 8.3 Minimum Latitude

25 Degrees 57 Minutes 28.80 Decimal Seconds

### 8.4 Maximum Latitude

29 Degrees 43 Minutes 49.80 Decimal Seconds

### 8.5 Name of area or region

Coastal distribution of sampling is in Galveston Bay, the East Bay Bayou of Galveston Bay and the Arroyo Colorado and the Rio Grande River systems in Texas.

## 9. QUALITY CONTROL AND QUALITY ASSURANCE

### 9.1 Measurement Quality Objectives

Measurement quality objectives were outlined in the Quality Assurance Project Plan. Accuracy and precision goals are outlined below:

| Fish Community Composition | Accuracy Goal | Completeness Goal |
|----------------------------|---------------|-------------------|
| Counting                   | 10 %          | 90 %              |
| Taxonomic Identification   | 10 %          | 90 %              |
| Length Determinations      | + 5 mm        | 90 %              |

## 9.2 Quality Assurance/Control Methods

Data from trawls which did not meet the requirements of a standard trawl were not included in this data file.

Data were run through series of Quality Control examinations:

- 9.2.1 The first method involved manually comparing each field data sheet entry against the electronically stored field data. This form of data validation ensured that data entered onto the field data sheets was correctly and completely transcribed. Occasionally, an error would occur that could not be flagged systematically (ie. Data sheet reflected a length of 11 cm and the electronic data record for the same fish reflected 14 cm. If the length range for this species is 9 cm to 16 cm then neither number is an outlier and a range checking program would not detect the error).
- 9.2.2 Electronic formatted data would also be run through series of programs which would test the validity of the data and provide a flagging mechanism to indicate that further investigation was required:
  - 9.2.2.1 Outlier checks on lengths and range of habitats.
  - 9.2.2.2 Taxonomic identification (ie. Common name was Hardhead Catfish but Species code indicates a Gafftopsail Catfish).
  - 9.2.2.3 Variable format issues (ie. Type an alphabetic "o" for a numeric "0").
  - 9.2.2.4 Comparing fish description data (ie. Taxonomic ids, lengths, etc.) received from labs with the primary EMAP-E fish database. If fish description data vary between the two set of databases the differences were investigated.

## 9.3 Actual Measurement Quality

N/A

## 9.4 Sources of Error

N/A

# 10. DATA ACCESS

## 10.1 Data Access Procedures

Data can be downloaded from the WWW site.

## 10.2 Data Access Restrictions

Data can only be accessed from the WWW site.

### 10.3 Data Access Contact Persons

Charles Howell  
U. S. EPA - Region 6  
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### 10.4 Data file Format

Data can be downloaded as ASCII fixed format files.

### 10.5 Information Concerning Anonymous FTP

Not accessible

### 10.6 Information Concerning WWW

Data can be downloaded from the WWW

### 10.7 EMAP CD-ROM Containing the Data file

Data not available on CD-ROM

## 11. REFERENCES

Heitmuller, P. T. and R. Valente. 1991. Environmental Monitoring and Assessment Program: EMAP-Estuaries South Texas coast: 1991 quality assurance project plan. EPA/ERL-GB No. SR-120. U. S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

Macauley, J. M. 1991. Environmental Monitoring and Assessment Program-Near Coastal Louisiana Province: 1991 Monitoring Demonstration. Field Operations Manual. EPA/600/X-91/XXX. U. S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

Macauley, J. M. 1992. Environmental Monitoring and Assessment Program: Louisiana Province: 1992 Sampling: Field Operations Manual. EPA/ERL-GB No. SR-119. U. S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

U. S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual - Estuaries, Volume 1: Biological and Physical Analyses. United States Environmental Protection Agency, Office of Research and Development, Narragansett, RI. EPA/620/R-95/008.

## 12. TABLE OF ACRONYMS

| ACRONYM | DESCRIPTION                                     |
|---------|---|
| EMAP    | Environmental Monitoring and Assessment Program |
| EPA     | Environmental Protection Agency                 |

FTP            File Transfer Protocol  
GPS            Global Positioning System  
REMAP        Regional Environmental Monitoring and Assessment Program  
WWW          World Wide Web

13. PERSONNEL INFORMATION

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